Log Event A

Borehole 20-00-02

Borehole Information

Farm : B	**Tank :** B	**Site Number :** 299-E33-51
N-Coord : 45,374	**W-Coord :** 52,488	**TOC Elevation :** 652.57
Water Level, ft :	**Date Drilled :** 11/30/1944	

Casing Record

Type :	Steel-welded	Thickness :	0.365	ID, in. :	10
Top Depth, ft. :	0	Bottom Depth, ft. :	150		
Type :	Steel-welded	Thickness :	0.406	ID, in. :	12
Top Depth, ft. :	0	Bottom Depth, ft. :	50		

Cement Bottom, ft. : 150 **Cement Top, ft. :** 149

Borehole Notes:

Borehole 20-00-02 was constructed in November 1944. Borehole construction information is provided in Chamness and Merz (1993). Drilling records indicate that the borehole was drilled to a depth of 50 ft using 12-in. steel casing and then extended and completed at a depth of 150 ft with 10-in. steel casing. The 10-in. casing was perforated from 49 to 149 ft at the rate of six perforations per foot. A grout plug containing half a sack of cement was placed at the bottom of the 10-in. casing.

The thicknesses of the 12-in. and 10-in. casings are assumed to be 0.406 in. and 0.365 in., respectively, on the basis of the published thickness for schedule-40, steel pipe.

Equipment Information

Logging System : 2	**Detector Type :** HPGe	**Detector Efficiency:** 35.0 %
Calibration Date : 10/1997	**Calibration Reference :** GJO-HAN-14	**Logging Procedure :** MAC-VZCP 1.7.10-1

Logging Information

Log Run Number :	1	**Log Run Date :**	05/05/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	128.5	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	22.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

Log Run Number :	2	**Log Run Date :**	05/06/1998	**Logging Engineer:**	Alan Pearson
Start Depth, ft.:	0.0	**Counting Time, sec.:**	100	**L/R :** L	**Shield :** N
Finish Depth, ft. :	23.0	**MSA Interval, ft. :**	0.5	**Log Speed, ft/min.:**	n/a

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Logging Operation Notes:

This borehole was logged by the SGLS in two log runs. The total logging depth achieved was 128.5 ft.

The top of the casing, which is the zero reference for the SGLS, is approximately even with the ground surface.

Analysis Information

Analyst : H.D. Mac Lean

Data Processing Reference : MAC-VZCP 1.7.9 Analysis Date : 10/23/1998

Analysis Notes :

The pre- and post-survey field verification spectra for all logging runs met the acceptance criteria established for peak shape and system efficiency. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation.

A casing correction factor for 0.771-in.-thick steel casing was applied to the concentration data for the combined thickness of the double casing from 0 to 50 ft. A casing correction factor for 0.365-in.-thick steel casing was applied from 50 to 150 ft for the 10-in. casing.

Shape factor analysis was applied to the SGLS data. Shape factor parameters can provide insights into the distribution of Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations. Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Results/Interpretations:

The man-made radionuclide Cs-137 was detected in this borehole. The contaminant was measured nearly continuously from the ground surface to 19 ft. Short continuous intervals and isolated occurrences of Cs-137 were detected intermittently from 21 ft to the bottom of the logged interval. The measured concentration at the ground surface was about 23 pCi/g. The maximum concentration of subsurface Cs-137 was 6 pCi/g measured at a depth of 0.5 ft. Measured Cs-137 concentrations elsewhere in the borehole ranged from 0.13 to 3 pCi/g.

The K-40 concentrations increase at a depth of 38 ft. The abrupt increase in the K-40 concentrations at 50.5 ft coincides with the transition from double to single casing in the borehole. The U-238 concentrations appear to

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be elevated above the normal background from the ground surface to a depth of about 40 ft.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Report for tank B-102.